



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/664,547

09/19/2003

Theodore W. Houston

TI-32205.1

4290

23494 7590 08/20/2008
TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

LEWIS, MONICA

ART UNIT

PAPER NUMBER

2894

NOTIFICATION DATE

DELIVERY MODE

08/20/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com
uspto@dlemail.itg.ti.com

Office Action Summary	Application No. 10/664,547	Applicant(s) HOUSTON, THEODORE W.	
	Examiner Monica Lewis	Art Unit 2894	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 1908.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 49-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 49-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed May 19, 2008.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 49-52 and 54 are rejected under 35 U.S.C. 103(a) as obvious over Turner (U.S. Patent No. 5,357,132) in view of Kurosawa et al. (U.S. Patent No. 4,951,175).

In regards to claim 49, Turner discloses the following:

a) a first insulating layer (66) disposed between a substrate and a first metal layer (68) (For Example: See Figure 9);

b) a trench defined by a recess in the first insulating layer (For Example: See Figure 9);

c) a first contact pillar (64) extending substantially from a top surface of the substrate to a bottom surface of the first metal layer (68) within the trench (For Example: See Figure 9); and

d) a capacitor formed in the trench overlying the first contact pillar such that the capacitor is formed at least in part on a side of the first contact pillar, and the first contact pillar is a plate of the capacitor (For Example: See Column 6 Lines 46-50).

In regards to claim 49, Turner fails to disclose the following:

a) the trench does not extend beyond the top surface of the substrate.

However, Kurosawa et al. ("Kurosawa") discloses that the trench does not extend beyond the top surface of the substrate (For Example: See Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor

Art Unit: 2894

device of Turner to include a trench that does not extend beyond the top surface of the substrate as disclosed Kurosawa in because it aids in providing high integration density (For Example: See Column 2 Lines 1-8).

Additionally, since Turner and Kurosawa are both from the same field of endeavor (semiconductors), the purpose disclosed by Kurosawa would have been recognized in the pertinent art of Turner.

In regards to claim 50, Turner discloses the following:

a) a second contact pillar (62) extending substantially from a top surface of the substrate to a bottom surface of another portion of the first metal layer wherein the second contact pillar is substantially the same height as the first contact pillar (For Example: See Figure 9).

In regards to claim 51, Turner discloses the following:

a) the capacitor comprises a storage element of a memory cell (For Example: See Column 1 Lines 15-25).

In regards to claim 52, Turner discloses the following:

a) a storage node of the storage element comprises a first contact pillar (For Example: See Abstract).

In regards to claim 54, Turner discloses the following:

a) the second contact pillar is a bit line contact pillar (76 and 78) (For Example: See Figure 11).

4. Claim 53 is rejected under 35 U.S.C. 103(a) as obvious over Turner (U.S. Patent No. 5,357,132) in view of Kurosawa et al. (U.S. Patent No. 4,951,175) and Fisher et al. (U.S. Patent No. 5,962,885).

In regards to claim 53, Turner fails to disclose the following:

a) a storage node further comprises a conducting layer lining the trench and the side of the first contact pillar.

However, Fisher et al. ("Fisher") discloses the use of a storage node further that comprises a conducting layer (80) lining the trench and the side of the first contact pillar (70) (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Turner to include storage node that comprises a conducting layer lining the trench and the side of the first contact pillar as disclosed in Fisher because it aids in increasing capacitance (For Example: See Column 1 Lines 51 and 52).

Additionally, since Turner and Fisher are both from the same field of endeavor (semiconductors), the purpose disclosed by Fisher would have been recognized in the pertinent art of Turner.

Response to Arguments

5. Applicant's arguments filed 5/19/08 have been fully considered but they are not persuasive. First, Applicant argued "the statement...that Turner teaches a trench defined by a recess in a first insulating layer 66...none of the drawings show a recess in element 66." However, Turner does disclose a recess in the first insulating layer (For Example: See Example: See Figure 9). Additionally, Applicant argued that "element 66 cannot be two separately claimed elements (i.e. both the capacitor dielectric...and the first insulating layer." However, Applicant is arguing limitations that are not in the claims.

Second, Applicant argued that "one having ordinary skill in the art at the time of the invention would not modify Turner to include the trench disclosed in Kurosawa et al. because the trench...taught by Turner is an isolation trench...and the trench of Kurosawa...cannot be an

isolation trench.” It is not clear what Applicant is arguing. They are both Dynamic Random Access Memory devices and capacitors are disclosed in the trenches of Turner and Kurosawa.

Third, Applicant argued that "Fischer et al. teaches the deposition of the conducting layer over the top of the second outer surface of the conductive pillar...but not on the side of the contact pillar." However, Fisher discloses the use of a storage node further that comprises a conducting layer (80) lining the trench and the side of the first contact pillar (70) (For Example: See Figure 6).

Finally, Applicant argued that “the bit line contact is not substantially the same height as the first contact pillar.” However, Applicant is arguing limitations that are not in the claims.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2894

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular and after final communications.

/Monica Lewis/
Primary Examiner, Art Unit 2894

August 19, 2008